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09/350,152	07/09/1999	MICHEL GARRAIT	03806.0456	7650

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EXAMINER	
OH, TAYLOR V	
ART UNIT	**PAPER NUMBER**
1623	12

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.	Applicant(s)
09/350,152	Garrait et al
Examiner	**Art Unit**
Oh Taylor Victor	1623

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on *Oct 26, 2001* .

2a) ☒ This action is **FINAL.** 2b) ☐ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) *15-34* is/are pending in the application.

4a) Of the above, claim(s) _____ is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) *15-34* is/are rejected.

7) ☐ Claim(s) _____ is/are objected to.

8) ☐ Claims _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☐ The drawing(s) filed on _____ is/are objected to by the Examiner.

11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved.

12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

13) ☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

a) ☐ All b) ☐ Some* c) ☐ None of:

1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

*See the attached detailed Office action for a list of the certified copies not received.

14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

15) ☐ Notice of References Cited (PTO-892)

16) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

17) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s). _____

18) ☐ Interview Summary (PTO-413) Paper No(s). _____

19) ☐ Notice of Informal Patent Application (PTO-152)

20) ☐ Other:

Final Rejection

The Status of Claims

Claims 15-34 have been rejected.

Claim Rejections-35 USC 103

1. Applicants' argument filed 10/26/2001 have been fully considered but they are not persuasive.

Rejection of claims 23, 27, 30, and 33-34 under 35 U.S.C. 103(a) as being unpatentable over Suchsland (U.S. 5,847,207) in view of Hsu et al (U.S. 5,856,567).

The rejection of claims 23, 27, 30, and 33-34 under 35 U.S.C. 103(a) as being unpatentable over Suchsland et al (U.S. 5,847,207) in view of Hsu et al (U.S. 5,856,567) is maintained for reasons of the record in paper no. 9.

Rejection of claims 15-18, 16, 19-22, 24-26, 28-29, and 31-32 under 35 U.S.C. 102(b)as being clearly anticipated by Suchsland et al (U.S. 5,847,207) has been changed to rejection of claims 15-18, 16, 19-22, 24-26, 28-29, and 31-32 under 35 U.S.C. 103(a) as being unpatentable over Suchsland (U.S. 5,847,207) in view of Hsu et al (U.S. 5,856,567).

The rejection of claims 15-18, 16, 19-22, 24-26, 28-29, and 31-32 under 35 U.S.C. 102(b)as being clearly anticipated by Suchsland et al (U.S. 5,847,207) has been changed to the rejection of claims 15-18, 16, 19-22, 24-26, 28-29, and 31-32 under 35 U.S.C. 103(a) as being unpatentable over Suchsland (U.S. 5,847,207) in view of Hsu et al (U.S. 5,856,567).

Claim Rejections - 35 USC § 103

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103© and potential 35 U.S.C. 102(f) or (g) prior art under 35 U.S.C. 103(a).

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

4. Claims 15-18, 16, 19-22, 24-26, 28-29, and 31-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suchsland et al (U.S. 5,847,207) in view of Hsu et al (U.S. 5,856,567).

Suchsland et al discloses a process for producing 2-hydroxy-4-methylthiobutyric acid by hydrolyzing 2-hydroxy-4-methylthiobutyronitrile (MMP-CH) in the following steps:

a. mixing 80 g 98 % sulfuric acid (0.8 mole) diluted with 40 g water (2.2 mole) with 98.6 % 2-hydroxy-4-methylthiobutyronitrile (MMP-CH) (1 mole) at 50^0 C.,

b. adding 75 g water (40.2 %) to the intermediate MHA amide, and

c. heating the mixture to 100-120^0 C. and evaporating the resultant mixture , thereby obtaining the desired MHA product (see from col. 9, lines 48-67 to col. 10, lines 1-8).

However, Suchsland et al differs from the instant invention in that the operation of the first step is not carried out under vacuum.

Hsu et al (U.S. 5,856,567) teaches a process for preparing 2-hydroxy-4-methylthiobutyric acid by introducing 2-hydroxy-4-methylthiobutyronitrile and an aqueous mineral acid into a nitrile hydrolysis reactor at a temperature of from 40 to 60^0 C. and feeding the nitrile hydrolysis reactor product steam containing the intermediate MHA amide into an amide hydrolysis flow

reactor at a temperature of from 60 to 100^0 C. at a pressure of from 0 to 1 bar (see col. 8 , line 9). In addition, the reference emphasizes that the rate of nitrile hydrolysis can be reduced by the excess water (see col. 5 , lines 53-55).

Concerning the failure of the Suchsland et al reference to teach the operation of the first step under vacuum, the Examiner has noted applicants' argument. However, the Suchsland et al reference does disclose the application of vacuum after the formation of the amide; furthermore, the Hsu et al does point out that the rate of nitrile hydrolysis can be reduced by the excess water (see col. 5 , lines 53-55).

Therefore, if the person having an ordinary skill in the art had desired to increase the rate of nitrile hydrolysis in the first step of the operation, it would have been obvious for the skillful artisan in the art to have operated the first hydrolyzing step of the Suchsland et al under the vacuum system in combination with the teachings of the Hsu et al so as to make a contribution to the enhanced production of the desired product.

In Response to Argument

5. Applicants argue the following issues:

a. Suchsland et al does not teach the operation of the hydration step under vacuum,

b. Hsu et al does not suggest that the first hydration step can be run under vacuum by stating the operating pressure range of from 1.013 to 2.046 bar,

c. Hsu et al actually teaches away from utilizing an acid/nitrile ratio between 0.6 to 0.88 to achieve the high selectivity of the 2-hydroxy-4-methylthiobutyric acid by stating that the preferred acid/nitrile ratio is 1.0-1.2, resulting in large quantities of ammonium sulfates for industrial discharge problems,

d. Hsu et al suggests nothing to motivate one of ordinary skill in the art to choose a low water/nitrile ratio to optimize the hydration rate,

e. Suchsland et al or Hsu et al or the combination of both has nothing to motivate one of ordinary skill in the art to modify the hydrolyzing step of Suchsland to include the selection of the molar quantity of water to 2-hydroxy-4-methylthiobutyronitrile between 1 and 3, the molar quantity of sulfuric acid relative to the 2-hydroxy-4-methylthiobutyronitrile between 0.6 and 0.88, and the

temperature being a less than or equal to 60^0 C. in the hydrating reactor.

Therefore, if the skillful artisan in the art had desired to achieve a high selectivity of 2-hydroxy-4-methylthiobutyric acid, it would have been obvious for the skillful artisan in the art to have used Hsu et al's pressure parameter of the hydrolyzing steps in the Suchsland et al's specific operating conditions so as to maximize the efficiency of the overall process.

The applicants' argument have been noted, but these arguments are not persuasive.

First of all, with regard to Suchsland et al's failure to teach the operation of the hydration step under vacuum, the Examiner has noted the argument. However, the Suchsland et al reference does disclose the application of vacuum after the formation of the amide; furthermore, the Hsu et al does point out that the rate of nitrile hydrolysis can be reduced by the excess water (see col. 5 , lines 53-55). Therefore, if the person having an ordinary skill in the art had desired to increase the rate of nitrile hydrolysis in the first step of the operation, it would have been obvious for the skillful artisan in the art to have operated the first hydrolyzing step of the Suchsland et al

under the vacuum system in combination with the teachings of the Hsu et al so as to make a contribution to the enhanced production of the desired product.

Secondly, concerning Hsu et al's failure to suggest that the first hydration step can be run under vacuum , the Examiner has noted the argument. However, the reference has been used as a secondary reference to supplement the primary reference so as to cure its deficiency. The primary Suchsland et al reference does disclose the application of vacuum after the formation of the amide; the vacuum system applicable to the process is well-known. Also, Hsu et al does teach the process for preparing 2-hydroxy-4-methylthiobutyric acid with respect to the rate of nitrile hydrolysis (see col. 5 , lines 53-55), which can be reduced by the excess water. From this Hsu et al's teaching, it does support the need in the evaporation of an excess water during the hydration step. Therefore, if the person having an ordinary skill in the art had desired to increase the rate of nitrile hydrolysis in the first step of the operation, it would have been obvious for the skillful artisan in the art to have operated the first hydrolyzing step of the Suchsland et al under the vacuum system in combination with the teachings of the Hsu et al so as to make a contribution to the enhanced production of the desired product.

Thirdly, regarding to Hsu et al's failure to utilize an acid/nitrile ratio between 0.6 to 0.88 to achieve the high selectivity of the 2-hydroxy-4-methylthiobutyric acid as well as to choose the low/nitrile ratio to optimize the hydration rate, the Examiner has noted the argument. However,

the Hsu et al reference does show a molar quantity of sulfonic acid to HMTBN ranging from 0.7 to 1.5 (see col. 5 , lines 49-52). Therefore, it does overlap the claimed range. Furthermore, applicants have not shown a unexpected result by a side by side comparison with the prior art reference. Therefore, if the skillful artisan in the art had desired to achieve a high selectivity of 2-hydroxy-4-methylthiobutyric acid by optimizing an acid/nitrile ratio in the process , it would have been obvious for the skillful artisan in the art to have experimented the acid/nitrile ratio in the process by routine experimentation so as to obtain the maximum yield of the desired product.. Thus, a prima facie case of obviousness is still applicable to the application.

Fourthly, in reference to Hsu et al's failure to choose the low water /nitrile ratio to optimize the hydration rate, the Examiner has noted the argument. However, it is well-known in the art that the dilution in the nitrile hydrolysis reactor prevents a liquid phase separation during the process as well as precipitation of ammonium bisulfate when sulfuric acid is employed. Therefore, if the skillful artisan in the art had desired to prevent any obstacle in the preparation of 2-hydroxy-4-methylthiobutyric acid due to the lack of water, it would have been obvious for the skillful artisan in the art to have diluted the concentrated 98.6 % 2-hydroxy-4-methylthiobutyronitrile feed stream to the 50 or 80 wt. % 2-hydroxy-4-methylthiobutyronitrile by a routine experimentation so as to prevent the liquid phase separation as well as precipitation of ammonium bisulfate during the process.

Fifthly, concerning the failure of Suchsland et al or Hsu et al or the combination of both to motivate one of ordinary skill in the art to modify the hydrolyzing step of Suchsland's parameters, the Examiner has noted the argument. However, Suchsland et al does disclose that the reaction takes place at 50^0 C. when sulfuric acid is mixed with 2-hydroxy-4-methylthiobutyronitrile (MMP-CH) in the presence of water. Also, the Hsu et al reference does show a molar quantity of sulfonic acid to HMTBN ranging from 0.7 to 1.5 (see col. 5 , lines 49-52) for the process. In addition, with respect to the selection of the molar quantity of water to 2-hydroxy-4-methylthiobutyronitrile between 1 and 3, this is closely related to the prevention of a liquid phase separation as well as the precipitation of ammonium bisulfate when sulfuric acid is employed during the process. Therefore, if the skillful artisan in the art had desired to achieve a high selectivity of 2-hydroxy-4-methylthiobutyric acid, it would have been obvious for the skillful artisan in the art to have used Hsu et al's parameters of the hydrolyzing steps in the Suchsland et al's specific operating conditions so as to maximize the efficiency of the overall process.

Therefore, the Examiner maintains the rejection of all the claims.

Conclusion

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL.** See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to T. Victor Oh whose telephone number is (703) 305-0809. The examiner can normally be reached on Monday through Friday from 8:30 to 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gary Geist , can be reached on (703) 308-1701. The fax phone number for the organization where this application or proceeding is assigned is (703) 308-4556.

T. Victor Oh

1/11/02

PAUL J. KILLOS
PRIMARY EXAMINER
1623